

ABSTRACT OF THE DISCLOSURE

A vehicle motor-generator apparatus based on a field winding type of synchronous machine coupled to a power inverter and a battery, wherein the synchronous machine is controlled to operate as a motor to perform engine starting and thereafter be driven by the engine as an electrical generator, wherein during a short time interval at the commencement of engine starting, the armature winding of the synchronous machine is driven by a current such that magnetic flux is produced by the armature winding acting in the same direction as magnetic flux produced by the field winding, to thereby achieve increased torque during the time when maximum torque is required. In addition, the supplied field current is set at a maximum value during only an initial period when engine starting begins, until the first compression stroke of the engine has been completed, and thereafter set to a reduced value until the completion of engine starting, thereby reducing the amount temperature rise within the field winding during engine starting, while ensuring a sufficiently high value of initial torque.

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